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ABSTRACT

The use of electric typewriters for beginning reading instruction was investigated. Thirty-six freshmen and sophomore education majors worked for 10 weeks with nine pairs of L-level (first-grade) children from the Wisconsin University laboratory school on SRA materials, Dolch phrases, and creative writing. Half used typewriters and the rest, pencils in front of a television camera. Pretests and post-tests were given, including the Gates-MacGinitie Primary Reading Test A, Dolch 220-word basic reading list, and the SRA reading series tests. Post-tests included the number of words written; Stanford Achievement Test, Form X, Primary Battery; and Hildreth Letter per Minute Test. The typing group showed more growth in the Gates-MacGinitie and the Dolch tests, but there were no significant differences in reading ability of the two groups at the end of the 10 weeks. It was concluded that (1) the use of the typewriters did not increase experience and speed or reduce reading learning and (2) the children enjoyed the machines and the attention of a college student. It was recommended that future studies might investigate whether a difference does exist if all the students are boys or have perceptual motor or handwriting difficulties. Tables and a bibliography are included. (Author/BM)

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Research Report

USING TYPEWRITERS AS A TOOL TO TEACH BEGINNING READING TO PRIMARY CHILDREN, TO IMPROVE INSTRUCTION OF PRIMARY TEACHER TRAINEES

U. S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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PREFACE AND ACKNOWLEDGMENTS

This paper was undertaken during the author's first year with Wisconsin State University at Stevens Point, Wisconsin, as a teacher of the ungraded primary children in the University Laboratory School.

It would have been impossible without the considerable assistance of Dr. Paul C. Holman, Dr. John Pearson, Dr. Wm. Kirby, Mrs. Mary Samter, and especially Dr. Hildegard Kuse. I thank them all.

SUMMARY

I. The problem under investigation: Can modern learning devices assist education with removal of obstacles of maturing? What is the educational worth of typewriters as a tool for beginning reading?

II. The methods used: Thirty-six freshmen and sophomores preparing to major in Education worked for ten weeks with nine pairs of selected L level children from the University Laboratory School working on SRA reading materials, Dolch phrases of commonly used words, and creative writing. Half the children used IBM typewriters for their work. The other children did the same work using pencils in front of a TV camera to negate the Hawthorne effect. After five weeks, the college students switched to work five weeks with the other child in the pair to negate personality differences.

III. The results obtained: We used the Gates-MacGinitie Primary Reading Test A, Forms I and II for pre and post testing. The children were given pre and post tests of their knowledge of the Dolch 220 word basic reading list. Scores of Level A, the book, A Pig Can Jig, from the SRA reading series were used as a pre score and scores of their end of the year reading book test from the SRA reading series were used as a post test score. The number of words each child wrote each day, each week, and totally was recorded both for words written as part of free creative writing time and for words written in sentences constructed with Dolch phrases. The Stanford Achievement Test, Form X, Primary Battery, was given at year's end. Scores in paragraph meaning, vocabulary, word study skills, and word reading were compared for the two groups. Also compared were scores on the Hildreth Letter per Minute Test. Daily attendance for each group was recorded. (Scores shown for Gates-MacGinitie are average raw scores, and scores shown for Stanford are average grade scores of the test given at 1.9.)

	Gates-MacG.		Dolch		SRA	
	Pre	Post	Pre	Post	Pre	Post
Typers	46	62.3	92.5	164.4	31.3	33.1
Non -	50	61.4	102.6	148.2	31.2	32.2

	Total Written	Days Absent	Hildreth
Typers	9,730	22	27.7
Non -	9,227	25	28.6

	Stanford Achievement Test			
	Paragraph Meaning	Vocabulary	Word Study Skills	Word Reading
Typers	2.1	2.96	2.28	1.9
Non -	2.3	2.95	2.72	2.23

IV. The significance, implications and recommendations:

The typing group showed more growth on the Gates-MacGinitie and Dolch tests, but there were no significant differences in reading ability of the two groups at the end of the ten weeks. However, the children found the typewriter stimulating based on personal observations by the author.

INTRODUCTION

It would seem logical that when children have maturational problems taken out of their learning situations, that they should then learn more efficiently. Many five, six and seven year olds who are learning to read find their progress slowed by the immaturity of the bone development in their hands as they first learn to manipulate a pencil with control. Can modern learning devices assist education with removal of obstacles of maturing? Can they help children to perform beyond the levels imposed by their own degree of muscular coordination development?

When the WSU Laboratory School purchased ten electric typewriters for their intermediate unit typing instruction, faculty discussions brought to light several convergent items.

The typewriters were available for part of the day for primary children. All but five of the children which might be involved in the study to come had had access to electric typewriters the previous year in school.

In the accumulated literature of the educational world, an increasing interest in use of electric typewriters with pupils of beginning reading ability was noted.

A specific search for documentation of a typewriter's value in the school room, using the University Library and the Eric Document Centers found no recent definitive studies.

This seemed to be our opportunity - an opportunity to explore the value of the typewriter as an educational tool.

METHODS

Our University Laboratory School is uniquely situated to give University freshmen and sophomores considering a teaching career, the opportunity to work with children, so three hundred letters were sent to freshmen and sophomores who had registered with the Primary Education Council. They were asked to work a twenty minute period with an individual child for as many days a week as they desired. Though no credit could be offered for this work, each girl was told that a notation of her service would be included in her folder in the Dean's office, if she so desired. Over sixty replies came in, a very good response from these busy students.

Our Continuous Progress Primary unit has ungraded classes in which children can progress at their own speed in reading and other subjects. However, children of the same age were together part of the day in a homeroom. Thus, it was decided to use the twenty-six children who had entered school at the Kindergarten level the previous year for this study. These children would be considered beginning readers, even though some had already moved beyond this category. For categorization purposes at school, these children will always be called the "L" Class, indicating only their school enrollment date (fall of 1967).

The children of the L Class had been given a Stanford IQ test and a Metropolitan Reading Readiness test in the spring of their Kindergarten year. Each child was given a class rank from 1-26 on the basis of his score for each test.

The Gates-MacGinitie Primary Reading Test A, Form I, was given and a rank from 1-26 was assigned to each of the L children corresponding to his score on the test.

Each child was asked to read the Dolch list of 220 most common sight words. The child who read the most words correctly was given a rank of 1, the next child a rank of 2, etc.

Since the school is currently using the SRA Basic Reading Series, another test score in reading was available. By mid-year each child had finished level A of this linguistic reading series. After each book level, the SRA reading program has a test devised to evaluate achievement. The

scores of the 26 children on their first tests were also ranked from 1-26.

These five rankings for each child in the L class were totaled. The total for each child was ranked from one to twenty-six; the two top children would be a possible pair for the study, as would children three and four, children five and six, etc.

The importance of giving the control group some kind of hardware to use was also considered. Otherwise, the "without" group might suffer from the Hawthorne effect, doing less well simply because they felt left out.

The typewriter group would be going upstairs, to the world of the intermediate "big kids," to work in the room electrically equipped to handle the electric typewriters. So it was determined that the control group would also use a room "upstairs with the big kids," and that they would consider themselves the TV group. While they were working a television camera would be on them, with their expectation that it was being viewed and perhaps taped on our closed circuit system in a viewing room downstairs.

All the children were shown the typewriter room. They learned how the machines work and discussed how they should be used.

All the children were also shown the "TV" room and they took turns watching each other on the TV monitor as friends read excerpts from their reading books before the camera.

A coin was tossed to decide which child of each pair would be in the TV group and which child would be in the typewriter group.

When thirty-six college students were found who could come on either a Monday and Wednesday or on a Tuesday and Thursday, mathematics dictated that we could then only use nine pairs of children in the study. (Two college students were needed for each of the children during one week.) The project did not operate on Fridays. The nine pairs were chosen by use of a random number table.

Half-way through the project, the college students for each pair switched children in the pair, so that their own personality differences were negated. Each child remained either in the TV or the typewriter group.

From 2:40 until 3:00 p.m. four days weekly, half the class worked in the two rooms upstairs. The rest of the class did normal language arts activities

in their classroom with their teachers, waiting for their turn from 3:00 to 3:20.

The college students were introduced to the rooms, the activities and the children on two successive "practice" days before the project officially began.

The activity in the twenty minute period was identical for all children.

At the appointed time, the college student picked up the child, the child's folder, and a notebook for that child, and they went to their appropriate room.

For five minutes the child read and then wrote his new words from the most recently studied pattern page in his class's reading book.

For the second five minute period, the child was asked to read three Dolch phrases randomly selected for that day, and then to write each one as part of a sentence.

During the third five minute period, the child was given a new sheet for creative writing, or he was given the opportunity to continue the piece of writing begun the previous day and filed in his folder.

Whenever the child asked his college student-teacher how to spell a word, she made a notation of that word in his notebook.

Each of the three types of work was dated and filed daily in the child's folder. Those in the typewriter room did all their writing with the electric typewriters. Their only instructions were to use two sheets of paper (to preserve the carriage), to type everything in capital letters (to simplify matters), and to remember to push the off button when they were finished. Those in the TV room did all their writing on lined paper with new yellow pencils provided by the project's funds.

We used the Gates-MacGinitie Primary Reading Test A, Forms I and II for pre and post testing. The children were given pre and post tests of their knowledge of the Dolch 220 word basic reading list. Scores of Level A, the book, A Pig Can Jig, from the SRA reading series were used as another pre test score and scores of their end of the year reading book test from the SRA Reading Series were used as a post test score.

The number of words each child wrote each day, each week and totally was recorded both for words written as past of the free creative writing time for

words written in sentences he constructed using Dolch phrases. The Stanford Achievement Test, Form X, Primary Battery, was given at year's end. The scores in paragraph meaning, vocabulary, word study skills, and word reading were compared for the two groups. Also compared were scores on the Hildreth Letter per Minute Test. Daily attendance for each group was recorded.

TABLE I.

RANKINGS ON PRE TESTS
(S is score; R is rank)

CHILD	IQ		MET.		GATES-M.		DOLCH		SRA (A)		TOTAL
	S	R	S	R	S	R	S	R	S	R	RANKS
A	133	7	94	2	75	2	217	1	35	3	15
B	150	1	96	1	67	4	155	5	33	7	18
C	129	9	88	7	82	1	215	2	-	1	20
D	143	2	87	10	73	3	180	3	-	2	20
E	142	3	92	3	64	5	168	4	34	5	20
F	138	4	87	10	54	11	132	7	30	9	41
G	130	8	87	10	63	7	105	10	33	7	42
H	135	5	75	18	57	8	124	8	34	10	49
I	107	23	89	6	63	7	149	6	34	10	52
J	124	15	84	12	48	12	74	11	34	5	55
K	125	14	90	5	54	11	73	12	31	14	56
L	118	18	77	15	43	14	106	9	34	10	66
M	113	21	79	14	46	13	69	13	32	13	74
N	133	7	76	17	56	9	40	23	30	20	76
O	128	10	87	10	32	19	41	22	33	17	8
P	127	12	81	13	27	23	48	18	33	12	78
Q	127	12	90	5	23	25	37	24	28	16	82
R	120	16	74	19	35	18	62	14	30	15	82
S	117	20	70	21	37	16	61	15	33	22	94
T	126	13	66	24	30	20	41	22	31	19	98
U	102	26	69	22	42	15	45	20	32	18	101
V	118	18	70	21	28	20	14	26	27	24	109
W	103	24	55	26	36	17	45	20	33	22	109
X	117	20	61	25	21	26	52	17	30	23	11
Y	100	26	67	23	27	23	52	17	26	25	114
Z	112	22	76	17	25	24	16	25	25	26	1.4

TABLE II. PAIRS AND GROUPS IDENTIFIED FOR STUDY

KEY: x = child available for TV group as decided by coin flipping for every two children, AB, CD, etc.
numbered pairs = chosen for study by random number table

	CHILD	TOTAL RANKS	RANKED	
x	A.	15	1)	Pair 1
	B.	18	2)	
x	C.	20	4)	Pair 2
	D.	20	4)	
x	E.	20	4)	Pair 3
	F.	41	6)	
	G.	42	7	
x	H.	49	8	
x	I.	52	9)	Pair 4
	J.	55	10)	
x	K.	56	11	
	L.	66	12	
	M.	74	13)	Pair 5
x	N.	76	14)	
x	O.	78	16)	Pair 6
	P.	78	16)	
x	Q.	82	18)	Pair 7
	R.	82	18)	
	S.	94	19)	Pair 8
x	T.	98	20)	
x	U.	101	21	
	V.	109	21	
x	W.	109	23	
	X.	111	24	
	Y.	114	26)	Pair 9
x	Z.	114	26)	

FINDINGS AND ANALYSIS

Table III gives an overview of the several test results comparing final scores for the typing group and the non typing group.

Specific scores for each test are given on individual later pages and expanded upon with comments.

TABLE III. OVERVIEW OF THE SEVERAL TEST RESULTS

	TYPERS	NON TYPERS
Ave. Gates-MacG. Raw Scores		
Pre test	46	50
Post test	62.3	61.4
Ave. Dolch Words Known		
Pre test	92.5	102.6
Post test	164.4	148.2
Ave. SRA Book Tests		
Pre test	31.3	31.2
Post test	33.1	32.1
Total Words Written Phrase-sentences and in free time	9,724	9,230
Days Absent (Unable to write)	22	25
Ave. Hildreth Letter Per Minute Test	27.7	28.6
Stanford Achievement (Ave. grade scores)		
Paragraph Meaning	2.1	2.3
Vocabulary	2.96	2.95
Word Study Skills	2.28	2.72
Reading Words	1.9	2.23

TABLE IV. GATES-MACGINITIE READING TESTS
(Raw scores for Vocabulary, Comprehension, and Total)

	PRE TEST			POST TEST		
	V.	C.	T.	V.	C.	T.
Possible Score	48	34	82	48	34	82
Typers						
B	45	22	67	47	32	79
D	44	29	73	47	33	80
F	36	18	54	43	29	72
J	34	14	48	44	26	70
M	30	16	46	44	15	59
P	11	16	27	35	19	54
R	26	9	35	41	16	57
S	19	18	37	31	19	50
Y	14	13	27	29	11	40
Typer Ave.	28.7	17.2	46	40.1	22.2	62.3
Non Typers						
A	47	28	75	48	34	82
C	48	34	82	48	32	80
E	42	22	64	48	31	79
I	39	24	63	46	33	79
N	30	26	56	38	16	54
O	24	8	32	32	13	45
Q	14	9	23	20	10	30
T	23	7	30	37	15	52
Z	15	10	25	38	14	52
Non Typer Ave.	31.3	18.6	50	39.4	22	61.4

TABLE V. DOLCH TESTS (200 words)
(Number known is test score)

	PRE TEST	POST TEST	DIFFERENCE
Typers			
B	155	217	62
D	180	209	29
F	132	180	48
J	74	180	106
M	69	190	121
P	48	122	74
R	62	149	87
S	61	144	83
Y	52	89	37
Mean	92.5	164.4	71.9
Median	69	180	74
		Range of Growth	29 - 121
Non Typers			
A	217	220	3
C	215	220	5
E	168	210	42
I	149	218	69
N	40	114	74
O	41	83	42
Q	37	86	49
T	41	106	65
Z	16	77	61
Mean	102.6	148.2	45.6
Median	41	114	49
		Range of Growth	3 - 74

At first glance, it seems that the typing group improved more in their knowledge of the Dolch words than did the non typing group. However, did the fact that nontyping children A and C were near the ceiling in the pre test make it impossible for their group to show as much gain?

TABLE VI. SCIENCE RESEARCH ASSOCIATES TESTS

	TEST FOR LEVEL A BOOK (PRE)	LAST TEST TAKEN FOR A COMPLETED BOOK (POST)
Typers		
B	33	35
D	not available	34
F	30	32
J	34	31
M	32	33
P	33	33
R	30	33
S	33	34
Y	26	33
Mean	31	33
Median	32.5	33
Non Typers		
A	35	34
C	not available	35
E	34	35
I	34	34
N	30	35
O	33	34
Q	28	23
T	31	34
Z	25	25
Mean	31	32
Median	32	34

Tests for Level A, the first reading book of stories in the SRA linguistic basic series, were taken at different times by the children, whenever they had finished reading this book in their regular reading program.

The reading ability of two children, a typer and a nontyper, was beyond Level A in September, so they did not read or take the test for it in their reading classes. (They had not read it the previous year either as the SRA books were newly purchased for our school.) Thus their scores are unavailable.

By May in our ungraded reading program, with our continuous progress prin-

ciple implemented with regrouping whenever an individual's progress called for it, the L children were reading at many different levels in many different books. Thus scores shown in Table VI, labeled LAST TEST TAKEN FOR A COMPLETED BOOK, are test scores for different books.

TABLE VII. WORDS EACH CHILD WROTE EACH WEEK
(Phrase-sentences and free writing)
(Four pairs of children shown on this page,
five pairs on next page.)

KEY: First number in each pair is the nontyper
"A" indicates absent all four project days of that week.
. indicates absent one day, or drew pictures in lieu of creative writing
.. indicates absent two days, ... three days
* Differences so marked are in favor of the typers

CHILDREN	A,B	C,D	E,F	I,J
Week				
1	56	103	81	109
	102	81	31.	77
2	66..	98	139	127
	122	27...	93	113
3	60..	115	76..	82.
	114	24...	106	111
4	98...	134	137	102
	144	111	111	103
5	110..	109	123	105
	145	117	112	145
6	107..	85.	145	108
	179	125	121	186
7	143	110	134	101
	192	167	142	214
8	186	124	142	96.
	178	149	139	216
9	143	107	137	117
	178	134	128	134.
10	192	128	158	124
	79.	140	186	161
TOTALS	1161	1113	1272	1071
	1433	1075	1169	1460
DIFFERENCES	272*	38	103	389*

TABLE VII. CONTINUED

CHILDREN	N,M	O,P	Q,R	T,S	Z,Y
Week					
1	94	26	77	A	93
	67.	82	30.	70	60
2	116	92	53.	75	188
	130	98	90	97	79
3	115	81	74	A	79
	26...	88	83	82.	69
4	145	98	79.	A	87..
	69..	99	67.	119	95
5	126	118	104	79	A
	124	79	50.	106	92.
6	118	61..	89.	117	87
	139.	102	73	109	88
7	116	100	110	113	96
	149	125	104	95	89
8	118	130	98	56..	117
	129	110	106	113	109
9	108	132	115	106	105
	109	98	75	76	88
10	52..	127	131	105	107
	135	83	66.	87	79
TOTALS	1108	965	930	651	959
	1077	964	744	954	848
DIFFERENCES	31	1	186	303*	111

Mean daily words by a nontyper was 25.5.
Mean daily words by a typer was 27.0.
(Absences discounted.)

TABLE VIII. WORDS EACH WEEK BY EACH GROUP

Week	TOTAL WORDS TYPING GROUP	TOTAL WORDS NON TYPING GROUP
1	600	639
2	849	954
3	703	682
4	918	880
5	970	874
6	1122	917
7	1277	1023
8	1249	1067
9	1020	1070
10	1016	1124

TABLE IX. DAILY AVERAGE WORDS PER CHILD EACH WEEK

Week	AVERAGE WORDS TYPING GROUP	AVERAGE WORDS NON TYPING GROUP
1	67	71
2	94	106
3	78	76
4	102	98
5	108	97
6	129	102
7	142	118
8	183	119
9	118	119
10	113	125

Children in the typing group wrote a total of 9,724 words while non-typers wrote only 9,230, a difference of 494 words in favor of the typing group. However, if these results are viewed in terms of individual pairs of children, only three of the typers as compared to six of the nontypers wrote more words than their corresponding partner.

In this study it would appear that there was no advantage in the speed of the machine over the rather immature muscle development of the average six year old writer.

In future studies it might be of interest to investigate whether such a difference might exist if for example one sample consisted entirely of boys, or entirely of pupils with perceptual motor difficulty, or of some group known to have handwriting difficulty.

TABLE X. HILDRETH LETTER PER MINUTE TEST SCORES (Post)

CHILD	TYPERS	CHILD	NONTYPERS
B	26	A	39
D	47	C	42
F	26	E	28
J	22	I	26
M	36	N	30
P	25	O	34
R	25	Q	29
S	22	T	4
Y	21	Z	26
Mean	27.7		28.6
Median	25		29

Children in both groups were given the Hildreth handwriting test in which the child is asked to copy a sentence from the blackboard. He is given two minutes to write. The total number of letters written within that period is counted and divided by two to arrive at a score of "letters per minute."

Note that in six out of the nine instances the handwriting speed advantage rested with the nontyper. Thus if the object of typewriter use were to give the child more experience with writing more words, it would appear that the pupils in this study did not derive that advantage from the use of the machines.

TABLE XI. STANFORD ACHIEVEMENT TEST (Given at 1.9)
GRADE SCORES FOR TYPERS

CHILD	PARAGRAPH MEANING	VOCABULARY	WORD STUDY SKILLS	WORD READING
B	3.1	4.8	3.4	2.6
D	4.0	3.6	3.0	2.4
F	1.9	2.7	2.6	1.9
J	2.0	3.6	2.8	1.8
M	1.7	2.3	1.8	1.9
P	1.7	2.7	1.5	1.4
R	1.6	2.2	1.8	1.9
S	1.5	3.1	1.9	1.6
Y	1.5	1.7	1.8	1.6
Mean	2.1	2.96	2.28	1.9
Median	1.7	2.7	1.9	1.9
Range	1.5-4.0	1.7-4.8	1.8-3.4	1.4-2.6

TABLE XII. STANFORD ACHIEVEMENT TEST (Given at 1.9)
GRADE SCORES FOR NONTYPERS

CHILD	PARAGRAPH MEANING	VOCABULARY	WORD STUDY SKILLS	WORD READING
A	4.0	3.1	4.8	3.6
C	4.0	4.8	5.5	3.6
E	2.7	4.4	2.8	2.6
I	2.5	1.6	3.4	2.5
N	1.5	3.1	1.7	1.8
O	1.4	2.6	1.6	1.7
Q	1.6	2.5	1.6	1.2
T	1.6	2.1	1.6	1.6
Z	1.5	2.6	1.5	1.5
Mean	2.31	2.95	2.72	2.23
Median	1.6	2.6	1.7	1.8
Range	1.4-4.0	2.1-4.8	1.5-4.8	1.2-3.6
TYPERS AND NONTYPERS				
Mean	2.2	2.9	2.5	2.1
Median	1.7	2.7	1.8	1.9
Range	1.4-4.0	1.7-4.8	1.5-4.8	1.2-3.6

CONCLUSIONS AND RECOMMENDATIONS

Did the typers show significant reading improvement beyond the nontypers? No, according to the pre and post scores of the Gates-MacGinitie, Dolch, and Science Research Associates tests.

Did the typewriter give an advantage in its speed of writing over the rather immature muscle development of the average six year old writer? No, according to the variously tabulated amounts of words written.

Did the typewriter give the children more experience with writing more words? No, according to the Hildreth Letter Per Minute Test.

Was the end of the year reading achievement significantly higher for one group or the other? No, according to the Stanford Achievement Test scores. It is interesting to note that the scores indicating the ranges for the total typers and nontypers are identical except for one of the eight scores.

Was the typewriter a disturbing influence reducing reading-learning efficiency? No. Did the children find the typewriters a stimulating approach to reading? Yes.

Interest in the machines was high. If any teacher has a machine available its use would certainly add another dimension to her teaching. Children demonstrated that they had no real difficulty in learning to use the machines. No damage of any kind occurred nor was any particular misuse noted. If machines were available in a school it appears that some children might benefit from their use simply because one additional means of motivation was available. There is, however, no evidence from this study to warrent special purchases of typewriters as aids to beginning reading.

It is the author's opinion that the overwhelming influence for good in reading may well have come from the eighty minutes weekly of individual reading attention which alone would probably have strengthened the reading interest and/or ability of twenty-six beginning scholars.

Were teacher trainees exposed to a learning tool not usually considered in their methods courses? Yes.

Individual children in the study in both groups enjoyed the personal interest shown by "their own" college student. The experiences provided one additional pre-student teaching contact with children, and with a media other than the traditional textbook for these undergraduate students.

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